THE Soybean Digest

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THE *Soybean Digest*

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IN THIS ISSUE

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Market Summary

	May 10	April 10
SOYBEANS		
Chicago Futures		
May	$1.33	$1.17½
July	1.29⅞	1.15⅝
October	1.22⅝	1.08¾
SOYBEAN OIL		
Tanks, midwest mills	9c	7½-⅝
SOYBEAN OIL MEAL		
Memphis, Tenn., Futures (Basis f.o.b. Decatur)		
May	$23.75 bid	$23.00
July	23.75 @ 23.90	22.75
December	23.40 @ 23.50	22.60 @ 22.80

(Above quotations from Roesling, Monroe and Company, Sterne & Son Company, and Zimmerman Alderson Carr Company.)

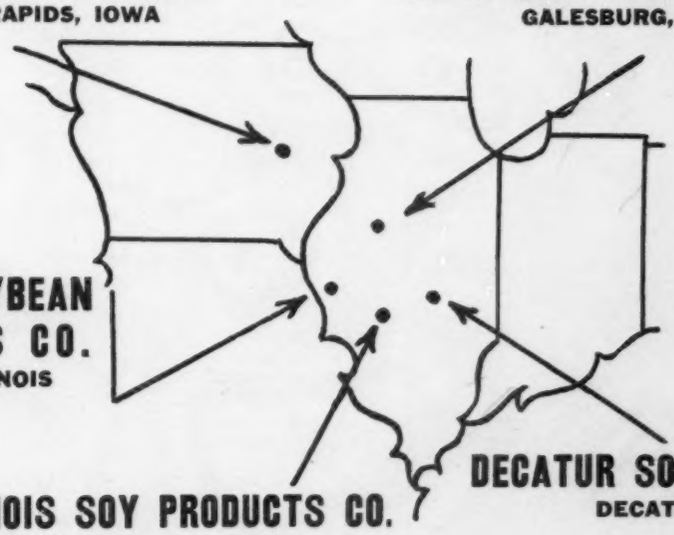
Soybeans continued last month's upward trend, following the strength in cottonseed oil, lard and soybean oil. Country movement of soybeans fell off the first part of May with the beginning of the period of heavy farm work. Inspected receipts during April totaled 3,738 cars, only 1 percent below the relatively large inspections of 3,786 cars in March. This brought total inspections from Dec. 1, 1940, to April 30 to 14,836 cars. Slightly over 40 percent of the April inspections graded No. 2 as compared with 35 percent in March.

The soybean oil meal futures market was very active in the last month, especially in the late futures, October and forward. January contracts were quoted on the Memphis board May 6, about 3 weeks earlier than usual. Prices showed no regular tendency to follow the rising soybean prices, however.

Five Associated Processing Mills . . . .

IOWA MILLING CO.
CEDAR RAPIDS, IOWA

GALESBURG SOY PRODUCTS CO.
GALESBURG, ILLINOIS



QUINCY SOYBEAN PRODUCTS CO.
QUINCY, ILLINOIS

DECATUR SOY PRODUCTS CO.
DECATUR, ILLINOIS

ILLINOIS SOY PRODUCTS CO.
SPRINGFIELD, ILLINOIS

Look for These Brands

Purity Brand
(Quincy Soybean Products Co.)

Sinco
(Illinois Soy Products Co.)

Hygrade
(Iowa Milling Co.)

Triple "V"
(Galesburg Soy Products Co.)

Illini
(Decatur Soy Products Co.)

Old Process, Expeller Type Soybean Oil Meal

BY THE CARLOT OR TRUCKLOAD

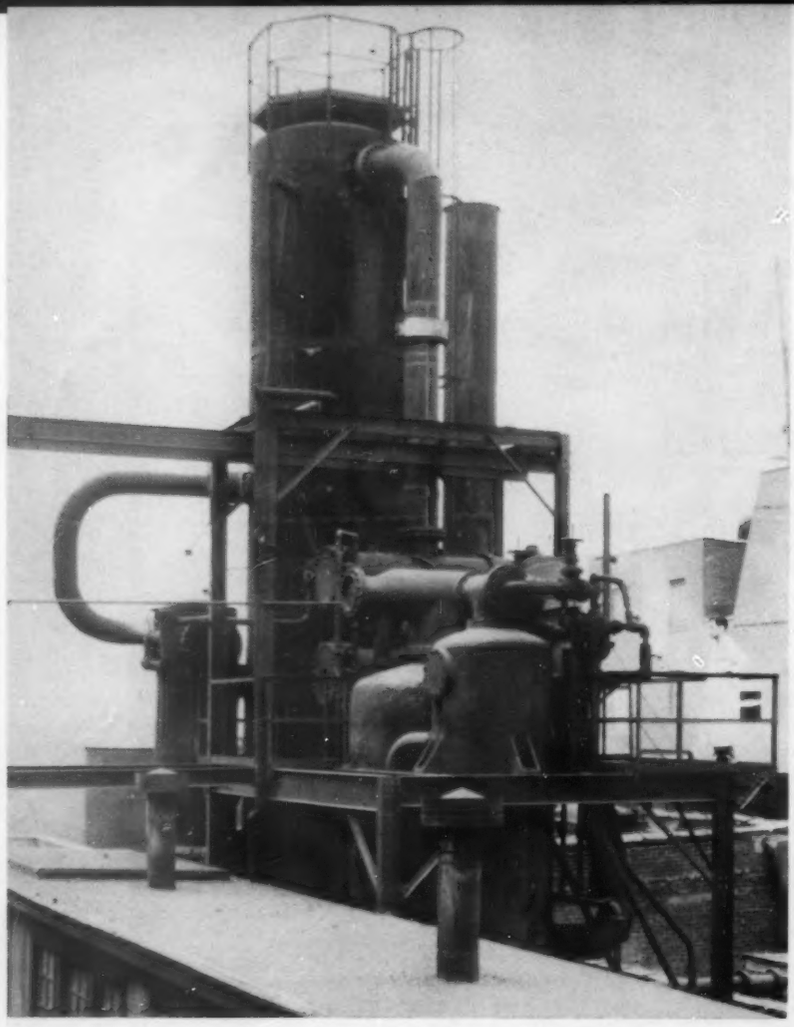
★

Want a direct source of supply for your soybean oil meal requirements? These five associated processing mills, strategically located through the heart of the soybean belt, offer such a source wherever you may be. All five of these mills manufacture old process, expeller type soybean oil meal — the "old reliable" kind, unsurpassed for its palatability and excellence as a protein concentrate for livestock feeding.

Farmers have a double stake in utilization of soybean oil meal. Not only is it a proven fact that liberal use of this rich feeding material increases the efficiency of the ration, but it supports the market of one of the farmers' most important cash crops — soybeans. Stock a big supply now, while meal prices are still so low as compared to other feed prices. We sell by the carlot or truckload.

★

. . In the Heart of the Soybean Belt! . .



At left is a picture of the refractionating tower used by Armour and Company in the manufacture of "Neo-Fat," their trade name for fatty acids produced by the fractional distillation method. These fatty acids are now being marketed in tank car quantities, and production facilities are being increased even further. The principle on which the process is based, and the uses into which the resulting products go, is explained in the article below.

Fractional Distillation Widens Soybean Oil Market

By DALE V. STINGLEY
Assistant Technical Director, Armour and Company

UNDOUBTEDLY the most publicized and at the same time least exploited usage of soybean oil is in the drying oil field. We hear of soybean paint, enamel, varnish, linoleum, printing ink, etc., but when the cold statistical facts are examined it is apparent that only a minor usage has so far been developed.

In 1940 the total production of soybean oil in this country was in excess of 500 million pounds, but of this figure only a bare 37 million pounds were consumed in the drying oil industries, although these same industries represent a market requiring some 600 million pounds of drying oil annually, much of which is imported. The consumption of soybean oil in shortening, margarine and other edible products has increased about 300 million pounds during the past 6 years, while the consumption in the drying oil field has increased only 30 million pounds. Likewise, the increase in consumption of soybean oil in the soap field has been negligible. All of these figures on the usage of soybean oil indicate that the problem of recovering the drying acids in soybean oil for use in paints and varnishes and the non-drying acids for use in soaps and other fields requiring non-drying acids was not an easy one to solve.

About the time soybean oil became commercially important in this country Armour and Company began to experiment with the possibility of breaking down fats and oils into their component constituents. All natural fats and oils are mixed glycerides, that is, combinations of glycerine with fatty acids, such as oleic, stearic, palmitic, etc. The distinctive properties and characteristics of an oil are due almost entirely to the properties of the particular fatty acids with which the glycerine is combined.

Two Fatty Acid Types

Two types of fatty acids are commonly found in all natural fats and oils. These are often referred to as *saturated* or *non-drying* fatty acids which have no drying or film forming ability and *unsaturated* or *drying* fatty acids which impart to the oil molecule drying or film forming properties. A good drying oil when exposed to the air tends to absorb oxygen and form a hard, resinous film, and such oils are necessary for the production of paints, varnishes, and enamels.

A comparison of the *drying* and *non-drying* fatty acid content of linseed oil, soybean oil and lard shows why linseed oil is especially suited for drying oil uses.

	Non-drying acids	Drying acids
Linseed Oil ..	13.5 percent	86.5 percent
Soybean	45.2 percent	54.8 percent
Lard	89.6 percent	10.4 percent

Oils must contain predominately drying fatty acids in order to be desirable drying oils and while soybean oil contains 55 percent drying fatty acids, this amount is not sufficient to give soybean oil good film forming properties, and the oil is therefore classed as a semi-drying oil.

The obvious method to utilize soybean oil as a drying oil is to separate and employ the drying and non-drying portions of soybean oil separately. This is, in effect, the principle on which the new Armour fractional distillation process operates.

In this process the soybean oil is hydrolyzed or broken down to its component fatty acids and glycerine, then after removing the glycerine, the mixture of non-drying and drying fatty acids are passed through a specially designed distillation column where the fatty acids are vaporized and separated into purified fractions according to their boiling points.

Other Methods Ineffective

Other methods such as crystallization and pressing and straight distillation have been employed in the past, but these previous methods were not applicable to soybean oil and did not give appreciable separation of the drying and non-drying components.

The outstanding advantages of the new fractional distillation process are that it is extremely flexible in operation and can be employed on a great variety of oils, as well as being by far the most efficient commercial method yet devised for the purification and separation of fatty acids.

In the case of soybean oil the drying and non-drying fatty acid fractions produced by this new process are readily usable in any number of applications

where soybean oil or mixed soybean fatty acids are totally unsuitable.

The drying fatty acids fractionally distilled from soybean oil find their greatest use in the production of synthetic resins of the alkyd type. Automobile finishes, refrigerator coatings, varnishes, enamels, printing inks, etc. are now employing this particular type of synthetic resin in an ever increasing volume.

Can Be Reconverted

For some uses it is necessary that the drying fatty acids of soybean oil be reconverted into a drying oil; this is a simple process in which glycerine is again chemically combined with the fatty acids. Such an oil reconstructed from the drying fatty acids of soybean oil is entirely different from the original oil and can be used in paints, oleo-resinous varnishes, core oil, linoleum and other uses where foreign drying oils are now largely used.

The non-drying fatty acid fraction from soybean oil find applications equally as important as the uses for the drying fatty acid fraction.

In rubber compounding non-drying fatty acids are necessary as softening, dispersing and accelerating agents. Even the new synthetic rubbers require fatty acids in their compounding, and one of these new synthetic rubbers contains as an essential ingredient one of the non-drying fatty acids obtainable only by fractional distillation.

Another important use for the non-drying fatty acids of soybean oil is in the manufacture of soaps. Soaps are normally made from fats and oils containing mixtures of fatty acids as nature has provided them, some of these fatty acids having desirable soap making properties and others undesirable. This fact has been demonstrated by laboratory and field tests on representative types of soaps, and it has been found that for a given specific purpose certain acids give superior results while other acids give definitely inferior results.

By the application of the fractionation principle two new household soaps have been developed and are now being offered to the public. These new soaps made entirely from domestic raw materials are produced from a combination of fatty acids which produce the greatest detergency and give performance records far better than anything previously known when compared with soaps made from blended natural fats and oils.

Still another important field for the non-drying acids of soybean oil is lubrication. Modern machines have become more and more exacting in their lubrication requirements, and here again the research chemist has found, as in the case of soaps, that certain fatty acids produce better lubricants than the usual mixtures of fatty acids found in nature. In railroad journal greases, high pressure gun and cup greases, in fact, in almost all lubricants fatty acids are essential ingredients.

By-products Important

The by-products of the fractional distillation of soybean oil fatty acids also are of the greatest economic importance. The glycerine, from which the fatty acids are split when the original soybean oil is broken down, is recovered and also the stearine pitch or residue left after fractional distillation of the fatty acids.

Glycerine is a well-known product. It has literally hundreds of uses in industry, based mainly on its outstanding properties as a softening and hygroscopic agent. Its most important uses are in tobacco, explosives, adhesives, synthetic resins, paper, textiles, printing, cosmetics and pharmaceuticals. Before the present war the United States imported a considerable amount of glycerine, however, in 1940, due to the diversion of glycerine in foreign countries from industrial to war uses, we exported glycerine for the first time in years.

Demand for Pitch Grows

Stearine pitch, the second by-product of fatty acid distillation, is not so well known as glycerine. At one time it had very limited uses, but today there is an increasing demand for stearine pitch as an ingredient in weatherproof electrical insulation, plastic moulding compounds, mastic flooring, coated corrugated sheeting, paints and enamels.

Both in theory and in practice the fractionation process opens up a broad new chemical field. We are now living in the formative stages of a chemical age and the changes that have taken place in the past 5 or 10 years through both choice and necessity have shown in a small way what is possible when efficient use is made of our natural resources. Soybean oil is but another of the many American agricultural products that through chemical research is becoming established as an essential raw material in the building up of America's economic defenses.

Changes Expected in Soybean Grades

CONFERENCES on the proposed changes in soybean standards were completed May 12 at a meeting in the Board of Trade Building at Chicago, Ill. This was the fifth conference held, others having been scheduled at Columbus, Ohio, May 5; Indianapolis, Ind., May 6; Decatur, Ill., May 7; and May 9 in Cedar Rapids, Iowa.

Attendance was good at these meetings, A. J. Barr, senior marketing specialist of the Agricultural Marketing Service, reports. Requirements for the new grades will be announced in June, and will be carried in the June issue of *The Soybean Digest*. Although the proposed changes explained in the April issue of *The Soybean Digest* probably will be altered, somewhat, there is little doubt after the discussion at the conferences but what changes in the standards will be made. Probabilities are that any such changes will become effective Sept. 15.

The need for changes in the grading system was made apparent to the Agricultural Marketing Service from a study of the distribution of soybeans marketed among the different grades. It was found that only 2 percent of the soybeans were grading No. 1, 35 percent were grading No. 2 and 45 percent, No. 3. Under such a system the No. 1 grade was of little practical use.

A series of tests were made in 1940 using the proposed new standards, with the result that 11 percent graded No. 1, 35 percent, No. 2, and 35 percent, No. 3. Under the present standards, 50 to 75 percent of the beans graded No. 2 are graded thus because of splits.

Recommendations of the processors at these meetings favor elimination of grade No. 4, combining foreign material and dockage as one factor, and urge that 13½ percent moisture be adopted as standard for all grades. Soybeans between 13½ and 15 percent moisture would be designated as No. 1, No. 2 or No. 3 "tough," and would be subject to a discount. All beans containing more than 15 percent moisture would be classed as sample grade.

The processors concurred with the suggestion that the size of the screen used in determining dockage be reduced from 10/64 inch round-hole screen to 8/64. This would hold back a considerable number of soybean particles which drop through the present size screen and are counted in the dockage. They recommended that "foreign material" be combined with dockage, and deductions from the weight of the beans be made according to the percentage of such material in excess of 1 percent. Under the present system, foreign material (such as straws, pebbles or grains of corn, which does not go through the sieves with weedseeds, sand, etc., which comprises dockage) affects the numerical grade.

Such recommendations, if adopted, would thus avoid lumping two important grade factors, moisture and foreign material, into three or four general classifications, and would establish penalties directly proportional to the extent of their severity. Processors accuse large terminal elevators of "blending" poor quality soybeans with carlots of good quality beans, until such carlots are just "under the wire" for beans of the higher grades, and their recommendations are aimed at this practice, they state.

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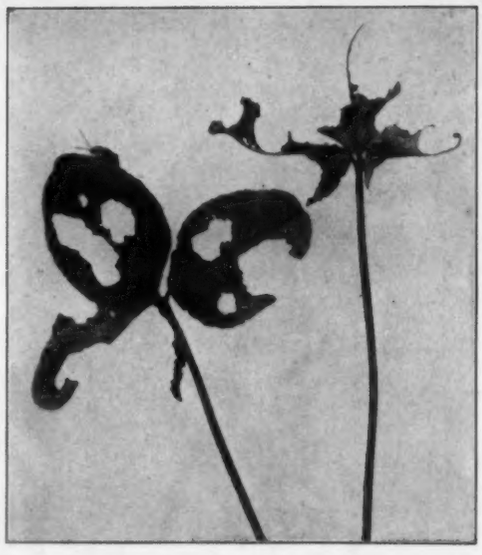
Soybean futures trading at the Chicago Board of Trade was transferred in April to the former corn pit, and corn futures trading was transferred to the pit vacated by soybeans. The volume of soybean futures trading has risen until it is now second only to wheat. The transfer provides better facilities for the heavy futures trading in soybeans.

Found--An Insect Enemy of Soybeans . .

By W. P. FLINT

Chief Entomologist, Illinois Natural History Survey Division and Illinois Agricultural Experiment Station



Adult colaspis [*Colaspis brunnea* (Fabricius)] on edge of clover leaf. The leaves show typical feeding by the beetles. The same type of feeding is done on soybeans.

(Cut by courtesy of Illinois Natural History Survey Division.)

SOYBEANS are such a fine food crop both as to the plant and the beans themselves, it is surprising that more insects have not turned to it as a source of food. During the last 3 years, and particularly during the 1940 season, we have had a considerable amount of insect damage on soybeans. The insect causing this damage is known as the colaspis. It is in the grub stage in the soil that the damage is done. If left to themselves, they would develop into a resting stage about the last of June in little cells excavated in the soil. During July and the first part of August, the full-grown colaspis, which are little pale brown beetles, will emerge from these soil cells.

These adult beetles are about 1/16 inch long, very pale brown, without any markings on their wing covers. There are rows of small punctures evenly spaced across these wing covers. The adults feed on the leaves of many different plants, including grape, all the legumes, the petals of flowers, leaves of smartweed, the silks of corn and a great many other plants. They mate during late July and the first part of August and lay their eggs, which hatch in about 2 weeks into tiny grubs. These grubs feed for a time and, as the weather gets cool, migrate downward in the soil to a depth of 6 to 8 inches and there pass the winter, completing their growth in the spring. It is possible that some of the insects may go through the winter in the egg stage.

Last year, thousands of acres of beans in Illinois had the yield cut from 10 to 50 percent or more. Practically all of these beans were on land that had been in soybeans in 1939. As far as we were able to check on the damage, there was no case where injury to soybeans occurred where beans did not follow soybeans or red clover. Only in a very few cases are beans planted on red clover sod, so that better than 90 percent of the loss due to the colaspis was on land where beans followed beans. The injury seems to increase quite rapidly where beans are run on the same ground for 3 years in succession. A number of such fields were called to our attention, where beans grown for the third successive year on the same land had the crop so badly damaged that the beans were plowed up, or if they were allowed to stand, that the yields ran only from 5 to 10 bushels to the acre, such yields occurring on land that had normally produced 25 to 30 bushels per acre.

As to the prospects in 1941, we can only say that the beetle stage or adult of the colaspis was more numerous in the fall of 1940 than it was in the fall of 1939. This would indicate a greater abundance of the insect in 1941. The dry fall of 1940 however, was rather unfavorable to the colaspis development and there may not be any noticeable increase in the numbers of the insect this year over that of last. However, we certainly do expect it to be fully as abundant, and for this reason it would be very desirable not to plant soybeans on land that was in this crop in 1940 or continuously for both 1939 and 1940.

The best methods of fighting the insects are: Fall plowing or early spring plowing of legume sod followed by as many diskings as seem practical, considering the cost and the returns to be expected from the crop. If the land is to be planted to corn, planting should be delayed as long as the variety to be grown will permit. The same is true if the land is to be planted to soybeans.

Dakotan Believes Soybean Acres Can Be Pushed Northward . . .

SOYBEANS can be grown profitably much farther north than in the localized area of the corn belt, believes Otto H. Faust, St. John, N. Dak., basing his belief on the performance of a number of varieties he has grown for several years. The town of St. John is on the eastern edge of the Turtle Mountains on the Canadian border of North Dakota, latitude 99 degrees, 45 minutes, elevation over 1,900 feet.

Faust's first active interest in soybeans was aroused by the results obtained in the Canadian province of Manitoba. "Their relative success led me to believe that they should certainly grow in North Dakota, farther south. A number of varieties raised in Manitoba have done very well each year," he writes. Here's his own description of some of his experiences in growing soybeans in one of the northernmost sections of the United States:

"I was not satisfied with seed available locally, and I began a campaign of mailing Manitoba soybeans to something like a third of the agricultural colleges in the United States, requesting other seeds in return. I did receive a very fine assortment of seeds this way, and I thoroughly appreciate the help these colleges gave me in getting a large number of varieties to test.

"It is entirely reasonable that a large number of varieties from stations farther south did not succeed in my trials. I have tried to discover what part in this result may have been played by actual length of frost-free season, by length of daylight as caused by my northern location, by amount of rainfall, by the variations in soil, by total amount of heat available during season.

"Among my principal conclusions is one often noted that soybeans seem to favor rather well localized conditions, according to the variety in question. I have noticed that the relative sizes of the seed as given by Dr. W. J. Morse (senior agronomist, Bureau of Plant Industry, United States Department of Agriculture) in the 1937 Yearbook of Agriculture are very different in my results from the ones he gives. Varieties that he finds at Arlington to give very small seed produce large seed here, as may well be expected of a variety better adapted here than there. Of course, most of his varieties will not do anything at all here.

"Among my Canadian soybeans I found a number of odd fellow-travelers. I selected a number of these at the rate of about one seed from a pound, and after several years of nursing I have produced a weird lot of freaks. Some plants among them have given some of the most promising sorts I have seen here to date. They

Canada Includes Many Excellent Soybean Acres

By F. DIMMOCK

Dominion Experimental Farms, Division of Forage Plants

CANADA has won six world's championships for soybeans at Chicago in the last 9 years. This should certainly dispel any doubt which may exist concerning the ability of Canada to produce soybeans. Within the area bounded by the locations in which these prizewinning samples were produced there is located 11,500 square miles of territory, much of which is capable of producing soybeans of equal quality to the samples which took top-honors at Chicago. This extensive territory is situated in the province of Ontario, and undoubtedly includes some of the best land in the world for the growing of soybeans.

At the present time, good crops of soybeans are being produced across Canada — in Ontario, southern Quebec, southern Manitoba, and British Columbia. Small areas in Nova Scotia have reported satisfactory yields, while experimental trials on irrigated land in southern Alberta have indicated possibilities in that region also.

So far there has been no large scale development in soybean production in Canada to parallel the phenomenal increase which has taken place in recent years in the United States. While little or no soybeans were grown in 1929, by 1940 it had reached only an estimated 12,000 acres, 10,600 acres of which were in the province of Ontario. Around 95 percent of the present acreage is harvested for seed, and not more than 15 to 20 percent of this is disposed of to the processing mills. There are two of these in Ontario. A new one is reported to be under construction in British Columbia.

SOME AVERAGE ANALYSES OF CANADIAN GROWN SOYBEANS

Station	Protein Percent	Oil Percent	Iodine No.
Brandon, Manitoba	42.5	19.8	130.8
Lethbridge, Alberta	41.6	17.6	134.7
Agassiz, B. C.	38.0	19.1	137.2
Harrow, Ontario	42.1	19.1	129.7
Ottawa, Ontario	36.9	20.6	130.5
Lennoxville, Quebec	35.7	22.9	133.6
Nappan, Nova Scotia	36.5	19.9	135.4

The bulk of the soybeans produced are fed to livestock on the farms on which they are produced.

Oddly enough, while the Canadian farmer feeds his soybeans the mills import their supplies largely from the United States. Most of the soybeans and soybean oil and meal enter Canada from the United States duty-free. The equivalent of 700,000 to 800,000 bushels of soybeans has been imported into Canada as an average for the past 5 years. At 20 bushels per acre this represents the yield from 35,000 to 40,000 acres of soybeans, all of which could easily be produced in Ontario.

The general high quality of Canadian soybeans is indicated by the average analyses of seed of several varieties grown in experimental trials at the stations listed in the table.

Oil content appears to be higher at the eastern stations where the supply of moisture is generally more abundant.

No official statistics giving yields are available, but reports from numerous growers in Ontario show the high average production of 20 to 25 bushels per acre. In southern Manitoba growers have reported yields averaging around 15 to 20 bushels per acre. These are the principal centers of production at present.

Ottawa Mandarin is the most commonly grown variety. Besides having a wide adaptation by reason of early maturity, it possesses several other excellent characteristics, among them being ability to yield well, high resistance to lodging, and good plant type. Other popular varieties are A. K. (Harrow), O. A. C. No. 211, Kabott, Pagoda, Goldsoy and Manchu. Some Manitoba Brown and Wisconsin Black are grown in western Canada, where extreme earliness is essential.

An active soybean research program has already resulted in the development of the following varieties: Mandarin (Ottawa), A. K. (Harrow), Kabott and Pagoda by the Dominion Experimental Farms, Dominion Department of Agriculture, and O. A. C. No. 211 and Goldsoy by the Ontario Agricultural College, Guelph. New and better adapted varieties are expected soon as the result of recent introductions and hybridization work. Excellent facilities exist for the testing of new productions by reason of the experiment stations which are maintained in every province, and which form a part of the Dominion Experimental Farms System.

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Peanut growers approved a 3-year marketing quota for peanuts in a referendum voted April 26, according to a preliminary tabulation of the United States Department of Agriculture. The national quota for 1941 is the amount of peanuts which will be harvested from the national acreage allotment. Peanuts for oil may be grown on any part of the cotton acreage allotment without incurring deductions from conservation and parity payments.

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range largely in the green-edible field, though not severely limited in any way, size, color, shape, type of growth or length of season.

"Among these types I have segregated, and am now increasing, several kinds that grow much shorter than the others, but produce a good yield of very large beans, very early. These should be well suited for common garden use in the green state. Other kinds make tall growth with very slender stalks and very small beans, which should be good for hay. A goodly number produce more ordinary types of plants with good yields of beans of a variety of colors, but largely the yellow color demanded by millers. Several good kinds are entirely without hilum color. Several types still await segregation, come summer."

Before the present war intervened, Faust corresponded with Sven A. Holmberg, member of the firm of Algot Holmberg and Sons, at Norrkoping, Sweden, and exchanged seeds with him:

"Mr. Holmberg originally got in touch with me through the office of Dr. Morse, in Washington, D. C.; the first I knew of him he had sent me seeds of a very early, hardy, pure yellow variety of soybean that he was raising at 58 degrees north latitude in Sweden, a country with a summer season that would be decidedly cool compared with our summer, to say nothing of the corn belt summer. I sent him several early varieties I had raised, and he sent me about half a dozen other kinds of soybeans and a number of other vegetable seeds that have done exceptionally well.

"The great problem he and I have been facing is that of finding a race of soybeans that are able to make a respectable growth and ripen seed in a growing season that is several weeks, if not months, shorter than the season in the corn belt. It seems now that we may have been more successful than was thought possible quite recently, in view of late results that compare very favorably with those achieved in the corn belt.

"Of course, I realize that the United States production of soybeans is sharply localized, as to quantity produced; but I have worked for several years toward making it possible to extend the northern limit of profitable soybean growing. I now believe that this is definitely possible, as shown by the performance of a number of varieties I have raised several years.

"I must hasten to add that I am not entitled to a great deal of credit, even for what I have done, as I have only carried on some work done by Dr. Morse; by Prof. A. F. Yeager, who was at the agricultural college at Fargo, N. Dak., but is now said to be at New Hampshire University; and some brave pioneering work done by the firm of McFayden Seed Company at Winnipeg, Manitoba."

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GEO. M. STRAYER, Editor — J. W. TOWNSEND, Managing Editor

VOL. I · NO. 7

WE don't want to seem dogmatic about this business of unproven varieties, but so much has come to our attention regarding McClave soybeans in the last few weeks that we can't help but put in a few words more. It seems that this purportedly marvelous variety is still being promoted quite enthusiastically in the Midwest. (*The Soybean Digest* carried a story in March on McClave soybeans, and commented editorially on them in the same issue.) Personally, we don't have an axe to grind either way. If there's a promising new variety developed, we will gladly tell you about it as soon as we learn of it, and on the other hand, if a variety appears to be a "phony" we'll tell you about that just as quick.

We do not say that the McClave soybean is worthless or that the marvels claimed for it are not true, but we do maintain that these claims lack concrete evidence. In other words, we're not ready to pass final judgment on the bean until we've seen it tested more thoroughly in plots with standard varieties. But this much we will say: We've heard complaints from at least three different processors on it's oil content, and tests conducted in 1939 and 1940 at the Ohio Experiment Station did not indicate it as an outstanding variety. Buyers should beware of salesmen who might seek to misrepresent the Ohio data in an effort to make the McClave variety seem outstanding. It all simmers down to this: Why pay fancy prices for a "pig in a poke" when good proven varieties are available at reasonable prices?

AN elderly farmer, who lives just up the road, tells me that he can remember the time when there were no potato bugs, and no blight, either. All you had to do, he says, was to prepare the ground, cut your "spuds" and plant, give 'em a lick and a promise, and harvest your crop. "Now," says he, "you have to fight like the devil to get anything."

Soybeans, since their introduction into this country, have been in the first potato category. Few insects, and almost no diseases, were known to attack soybeans. They seemed to have no natural enemies. We were just lucky enough not to have them in this country.

Now we find the grape colaspis feeding on soybeans. Diseases seem to making inroads. We must watch them carefully, and be prepared if they continue to spread. We must be ready with cures for the ills. That is why we asked Dr. Flint to write the first of this series of stories on soybean production hazards. We must recognize disease and insect damage when we see it.

LAST month *The Soybean Digest* carried a story announcing a series of conferences on a proposed set of new grading standards for soybeans drawn up by the Agricultural Marketing Service of the United States Department of Agriculture. This month there is another story on some of the discussion brought out at these conferences, especially at the Cedar Rapids conference which the editor attended.

Processors at this conference recommended rather strict gradations of moisture content and foreign material at this conference as a cure for the practice, in which some less scrupulous terminal elevators sometimes indulge, of "blending." This means mixing poor quality soybeans with good quality beans in quantities just sufficient to bring the better quality beans to the lower fringe of their grade.

Blending of course is an economic waste. The industry pays for it, and dearly. Processors are forced to discount prices sufficiently to allow for the dockage and moisture shrinkage, along with drying costs. Blending merits the condemnation of processors and growers alike, in an effort to prevent it.

If such a system is adopted, a word of caution is in order for the protection of the grower. Since penalties would be on rather narrow gradations of quality, grading and moisture determinations would need to be correspondingly more accurate and many country elevators might find it necessary to install equipment for grading and moisture determination which they do not now possess, if the benefits of the new grading system are to find their way ultimately to the grower of premium quality soybeans.

ON the back page of *The Digest* this month appears an advertisement for the annual convention of the American Soybean Association. *Tempus fugit*, as our dimly-remembered Latin grammar used to say, and it's not too early to begin planning and boosting for this greatest event of the year for your association. Let's make this the biggest and best convention yet.

Hopper Begins Director's Duties At Soybean Laboratory

Dr. T. H. Hopper

Dr. T. H. Hopper, formerly leader of the analytical section, United States Regional Soybean Industrial Products Laboratory at Urbana, Ill., became acting director of the laboratory May 1. He succeeds Dr. R. T. Milner, who went to the United States Regional Agricultural Byproducts Laboratory at Peoria, Ill., as a research chemist.

Dr. Hopper was born in Jacksonville, Ill., and spent his boyhood on farms in Illinois and Missouri. His college work was taken at Westminster College, Fulton, Mo., and the University of Missouri at Columbia.

During World War I he served in the United States Naval Reserve, being an aviation instructor of ground men at Great Lakes and on the detail that wrote war performance records of naval aviation training schools.

Dr. Hopper was assistant and later instructor in agricultural chemistry at the University of Missouri College of Agriculture from 1917 to 1920, except for his period of service in the United States Navy. He was at the North Dakota Agricultural Experiment Station at Fargo as agricultural chemist from 1920 to 1939, when he became leader of the analytical section of the Regional Soybean Laboratory.

He is a member of Gamma Alpha, graduate scientific fraternity, Alpha Chi Sigma, professional chemical fraternity, and was initiated May 14 into the Illinois University chapter of Sigma Xi, honorary science fraternity. He is a member of the American Chemical Society, 1923; American Oil Chemists' Society, 1936; and a Fellow of the American Institute of Chemists, 1940.

He has been author or joint author on about 20 experiment station bulletins and journal articles on agricultural chemistry subjects and analytical methods.

The Regional Soybean Industrial Products Laboratory was established early in 1936 under provisions of the Bankhead Jones Act. It is a cooperative organization in which participate the Bureaus of Agricultural Chemistry and Engineering and Plant Industry of the United States Department of Agriculture, and the Agricultural Experiment Stations of the North Central States of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North and South Dakota, Ohio and Wisconsin.

Dr. O. E. May was its first director, and he was succeeded by Dr. Milner when Dr. May went to head the work at the Regional Agricultural Byproducts Laboratory at Peoria, Ill. The purpose of the Soybean Industrial Products Laboratory is to develop new industrial uses for soybeans and to improve manufacturing processes now in use.

Soybeans . . . and People

Soybean Crackers Get Wide Reception

Four varieties of soybean crackers now being marketed in quantities are shown in this photograph submitted by the Soy Bean Products Company of Chicago, Ill. An attractively packaged roasted salted soybean is also shown. The Chicago plant of the National Biscuit Company is just beginning production of Soya Cocktailers for distribution in the Midwest. Previously they were distributed for the most part in the area roughly bounded by Boston, Mass.; Washington, D.C.; and Cleveland, Ohio. All of these products possess a delicious flavor which appeals to the average consumer as well as soybean enthusiasts.

English Experiments Indicate Soy Flour, Dried Milk, Good Breast Milk Substitute . . .

SOYBEAN flour and dried milk proved a cheap and efficient substitute for breast milk in infant feeding, investigations of Helen M. M. McKay, member of the staff of the medical research council and physician to the Queen's Hospital for Children, London, England, indicated. Results of the investigations were published in the March, 1940, number of "Archives of Disease in Childhood," British Medical Association, Tavistock Square, London.

To a group of 48 babies was fed a mixture called "Yolac," prepared from equal parts of dried milk and soya flour, with sugar, orange juice and cod liver oil emulsion added to the diet. Another group was fed dried milk with added iron, sugar, orange juice and cod liver oil emulsion, and a third group was fed a similar diet with vitamin D emulsion substituted for cod liver oil. One hundred and two babies were included in the two latter groups.

The general progress of most babies in Yolac and control groups was good; Yolac babies looked better than those fed on cow's milk without extra iron, the hemoglobin level of the blood was 80 percent, described as satisfactory and much higher than would be found in babies fed on unmedicated milk. The morbidity rates of the three groups was about the same, and therefor better than would be expected with babies fed on milk without added iron. Evidently the soya flour was a good source of iron.

Yolac babies were less troubled with constipation, and an alkaline urine was much more frequent. Bones were as good in the Yolac group as in the control group. The average weekly gain of the Yolac babies was 3.98 ounces, that of the controls, 4.03 ounces.

—sbd—

Edible soybean varieties that do not shatter in the field are hard to shell as green beans, and their rating for food use lowered on that account, it was noted in early observations of soybean varieties at the University of Illinois with reference to their use as a food.

Recipes

SOYBEAN PIECRUST

1 cup sifted soybean flour
1½ cups sifted white flour
1 teaspoon salt
5 or 6 tablespoons fat
About 2½ tablespoons water

Mix the flours and salt and work in the fat with the tips of the fingers or a fork or biscuit cutter. When the flour and fat are "grainy," add the water slowly, and use no more than absolutely necessary to make a stiff dough. Proceed as usual for piecrust.

SOYBEAN FLOUR YEAST BREAD

1 cup skimmed milk
1 cake compressed yeast
2 tablespoons sugar
1½ tablespoons fat
1¾ teaspoons salt
3½ cups soft wheat flour, or
3 cups hard wheat flour
¼ cup soybean flour

Scald the milk and cool to room temperature. Add the yeast and sugar and let stand for one-half hour. Add the melted fat, salt and then the flour, reserving a little of the wheat flour for the board during kneading. Knead for 10 minutes, let rise in a warm place for one-half hour and then knead again for one minute. Repeat the rising and kneading twice more. Shape into a loaf and let it rise in a greased pan for about one hour or until double in bulk. This amount of dough will fill a pan 4x9x3 inches and the dough should rise to ⅝ inches above the edge of the pan before it is placed in the oven. Bake for 50 minutes in a moderate oven (375° F.).

—sbd—

Ohio Crowds Largest

Breakdowns in attendance figures of the Soybean Special train reveal that an average of 558 persons attended at 15 stops in Ohio. Seventeen Indiana stops averaged 313 visitors, and 19 Illinois stops averaged 308 visitors.

Ohio also had the largest average attendance at the women's cooking schools, with 133. Indiana cooking schools averaged 99 visitors, and Illinois, 71. The largest total attendance at a single stop was at Lodi, Medina County, Ohio, where 1,000 persons attended.

The Soybean Special, which toured Ohio, Indiana and Illinois from Feb. 4 to April 2, was operated by the Baltimore and Ohio Railroad in cooperation with the American Soybean Association and the state college extension services.

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Imports of perilla oil into the United States from Manchuria and Japan in the 5 years 1935-39 averaged more than 60 million pounds annually. Imports dropped sharply in 1940, and seem likely to continue small in 1941.

Margarine Production Increases in March

Margarine production increased sharply in March after falling off in February. Total production of colored and uncolored margarine was 33,879,998 pounds in March as compared to 28,102,717 pounds in February. Production was 27 percent above the March, 1940, output of 26,661,149 pounds.

Soybean oil comprised 27 percent of the margarine ingredients in March, or 7,169,179 pounds. This compares with 25 percent in February and 26 percent in March, 1940. Coconut and babussu oils, imported oils once important in margarine manufacture, continued at levels far below those of 1940, with 66,280 pounds babassu oil, and 1,308,270 pounds coconut oil being used as compared to 525,197 pounds and 2,421,474 pounds, respectively, in March, 1940.

—sbd—

Exports of soybeans amounted to only 2.4 million bushels in 1940 compared with 10.5 million bushels in 1939. Exports to the Netherlands and Scandinavian countries, the principal buyers in recent years, virtually ceased following the imposition of the British blockade last spring.

Vegetable Oil Imports Increase But Oilseed Imports Show Decline

IMPORTATIONS of vegetable oils during the 3 months ending March 31, 1941, exceeded imports in the same period of 1940 by 4,690,756 pounds, according to United States Department of Commerce figures. Importations of oilseeds were lower in general, however, especially copra and babassu nuts and kernels.

Importations of vegetable oils during March were about the same as in March 1940, but importations of copra and babassu nuts and kernels declined sharply.

Cottonseed oil exports of 2,326,812 pounds in March were slightly above the 1940 level, lard exports of 24,328,737 pounds exceeded last year's figures for the first time in several months, while soybean exports ceased entirely and exports of soybean oil were at less than two-thirds of the 1940 level with 1,878,272 pounds.

Imports in Pounds of Major Vegetable Oils and Oilseeds During March and First Quarter of 1941 with 1940 Comparisons

	March 1941	March 1940	3 Mos. Ending Mar. 31, 1941	3 Mos. Ending Mar. 31, 1940
OILS				
Cottonseed	None	110,113	None	5,730,237
Corn	None	None	579,354	233,626
Peanut	88,048	310,580	243,869	778,304
Sesame	2,931	2,928	12,120	9,872
Soybean	249,799	8,168	254,848	1,369,771
Palm kernel	None	None	None	None
Coconut	25,831,224	34,265,965	80,194,740	95,392,555
Palm	23,076,095	14,936,366	71,742,746	44,822,556
	49,248,097	49,634,120	153,027,677	148,336,921
OILSEEDS				
Copra	40,398,744	71,266,747	141,528,098	213,891,803
Babassu nuts, kernels	5,731,960	14,682,646	22,200,271	29,332,642
Rapeseed	781,217	303,641	5,223,027	1,961,132
Sesame seed	558,384	1,328,281	2,470,728	4,502,946
Palm-nut kernels	2,660,610	None	11,349,864	1,741,130

Oil Yield: Copra 63 percent, Sesame seed 45 percent, Rapeseed 35 percent, Babassu kernels 63 percent, Palm kernels 45 percent.

Corn Data Summary Shows Potential Value of Soybean Yield Contests

WHAT information can a soybean yield contest provide, other than deciding who can raise the most soybeans per acre? An indication of the value of such contests, extended over a period of years, is given by a study of similar corn contests, conducted annually in most states throughout the corn belt.

One of the most effective of these contests, from the standpoint of significant data derived, has been that of the Illinois Crop Improvement Association. The 1940 growing season closed the eleventh annual ten-acre corn growing contest in Illinois, and a 11-year summary prepared by J. C. Hackleman, extension crops professor at the University of Illinois, crystallized the large amount of statistical knowledge accumulated over the 11-year period.

The Illinois corn growing contest takes into account the cost of production and the quality of the corn produced, as well as the yield. Specifically, 40 percent of the score is for yield, 40 percent for cost of production and 20 percent for quality of corn. The information regarding production methods is stressed as a part of the final score.

It was found that many producers turned in records during several years of the contest, thus providing opportunity to study trends and changes in production practices over a period of years. Here are some of the things revealed by the Illinois corn growing contest:

Working for high yields pays on a cost per bushel basis. Contestants had an 11-year average yield of 95.64 bushels per acre produced at an average cost of 25 cents per bushel, including charges for fertility elements removed. Farmers keeping cost accounts in cooperation with the department of agricultural economics at the University of Illinois reported an average yield of 48.4 bushels per acre at a cost of 37 cents per bushel over the 10-year period 1930-40. For the state as a whole during the same period, the Illinois Agricultural Statistician reported an average yield of 36.2 bushels per acre at a cost of 47½ cents per bushel.

Besides showing that Illinois corn farmers were producing at levels far below the most profitable intensive margin, the data revealed results on many phases of soil management. Corn yields averaged 4½ bushels higher following alfalfa or clovers than after any other crop (25 fields of corn following soybeans showed the poorest average yield of all, 83.40 bushels per acre, compared to 99.15 bushels for 235 fields of corn following alfalfa or clovers). Tile-drained fields averaged 4.26 bushels per acre more than un-tiled fields. Acid soil yielded 9.6 bushels per acre less than neutral or sweet soils. Manure increased yields 2.4 bushels per acre, rock phosphate, 4.3 bushels, and commercial fertilizer, 10.1 bushels per acre.

Plowing to a depth of more than 7 inches produced nearly 5 bushels per acre more than plowing less than 7 inches deep. Hybrid corn yielded nearly 25 bushels per acre more than open-pollinated and seedings of over 9.1 pounds per acre produced 11 bushels per acre more than seedings at the rate of 7 pounds per acre. The second week in May was indicated as the optimum planting time, and the closest spacing of hills used produced the highest yields.

"If we can obtain one half this valuable information for soybeans that we have for the facts and fundamentals of corn growing, we will have done much," says J. E. Johnson, Champaign, Ill., chairman of the Illinois ten-acre corn growing contest and president of the Illinois Farm Chemurgic Council, co-sponsor with the

Illinois Crop Improvement Association of the Illinois Soybean Yield Contest.

Thus judging from the information gained from the study of a corn yield contest, soybean yield contests may be expected to supply information on which varieties are highest yielding, best spacing of rows, rate of seeding, time of planting, best crops for soybeans to follow in the rotation, fertilization, liming, drainage and seedbed preparation.

Contests are being held for the second year this season in Indiana, while Illinois and Iowa are planning their first. Sponsors of the Illinois contest, the Illinois Farm Chemurgic Council and the Illinois Crop Improvement Association, hope to have rules and regulations drawn up before the close of the planting season. In Iowa, the Corn and Small Grain Growers' Association will appoint a committee to draw up rules and regulations for measuring yields, and these rules will be announced before the start of the harvesting season. The Indiana Corn Growers' Association sponsors the contest in that state.

—sbd—

Around-the-Field Planting Advised

Planting soybeans around the field rather than back and forth is one way of solving the problem of ridges when combining time comes, says W. G. Weigle, Van Wert, Ohio, writing in the April 5 issue of The Ohio Farmer. Although ridges may be formed in cultivation just as in straight rows across the field, the combine is able to follow these ridges rather than going across some of them.

Weigle, who is manager of Marsh Foundation Farms, says they have been following some of their beans with wheat. Using a disc drill of the same width as the combine, they follow the combine immediately around the field, scattering the straw on the sown wheat. The straw makes a good thin mulch and acts as a protection to the wheat in the winter and spring months, when alternate freezing and thawing would otherwise kill the wheat.

Earlier maturing varieties rather than earlier seeding dates are used to get the soybeans ripe in time for seeding wheat. A summary of data at the Ohio Agricultural Experiment Station shows that it is necessary to plant 3 days earlier in the spring for each day gained in the fall, and too early planting of beans invites heavy weed infestation.

—sbd—

Urea Too Expensive For Protein Substitute

Although urea may replace protein in rations for lambs, the results were not wholly satisfactory in recent University of Illinois tests. It was demonstrated in the laboratory that lambs were able to use the nitrogen of urea, but apparently only ruminants such as sheep and cattle have this ability. Bacteria in the paunches of the ruminants change the nitrogen from a non-protein to a protein form, and the ruminant then makes use of the bacterial protein.

In an 84-day feeding test one lot of wethers was fed urea instead of the soybean meal fed to a comparable lot. Rate of gain was slightly in favor of the soybean meal lot, and its gains were 94 cents per hundredweight cheaper. Carcass grades and flavor of meat were practically the same for the two lots.

The tests indicated that urea might be used as a substitute for protein in sheep feeding, but it also showed that such a change is expensive under present conditions.

U. S. Increases Use of Castor Beans for Oil

Bahia, Brazil, is expected to maintain 1941 castor bean production at about the same level as 1940 (40,000 to 45,000 short tons) as the result of heavy Japanese and United States purchases in the last half of 1940, which more than compensated for lost Italian markets. The United States purchased 51,361,000 pounds of castor beans from the port of Bahia in 1940, compared to 38,956,000 pounds in 1939 and 42,295,000 pounds in 1938. Shipments from Bahia represent about 25 percent of Brazil's total castor bean exports.

Books and Bulletins

HUNGER SIGNS IN CROPS, by fourteen specialists in agronomy, horticulture, plant nutrition and plant diseases (340 pp., illustrated with 79 color plates and 95 halftones, Judd and Detweiler, Inc., Washington, D.C., 1941, $2.50). Modern science has found that many so-called plant diseases are in reality "hunger signs," or symptoms of plant-food deficiencies. Farmers gave them such names as "fired" corn, "sand drown" in tobacco, "die-back" in citrus, "drought spot" in apples, "heart rot" in beets, "rust" in cotton.

The book's nine chapters deal with all of the major and many of the minor crops, and were written by a group of 14 scientists assigned by the American Society of Agronomy committee on fertilizers. The National Fertilizer Association assumed the responsibility of finding a way to publish the book, of which over 6,000 copies have been sold in advance of publication.

It is adapted to the use of county agents, vocational agricultural teachers, agricultural extension specialists, farmers and scientists.

SOYBEAN MEAL FITS INTO LIVESTOCK RATIONS, mimeographed circular, University of Illinois Agricultural Extension Service.

—sbd—

United States stocks of fats and oils, oilseeds in terms of oil, and of certain derived products totaled approximately 3.3 billion pounds at the end of 1940, or about a third of a year's supply. At this level stocks were 283 million pounds larger than a year earlier and the largest on record for the year-end.

SEED DIRECTORY

Members of the American Soybean Association may list varieties of which they have seed for sale in the Seed Directory of The Soybean Digest. Up to three varieties may be listed throughout the seed trade season, January, February, March, April and May issues, for a charge of $1 to Association members. Additional varieties may be listed at the same rate, three for $1.

FIELD VARIETIES

Mukden

Tracy and Son Farms, Janesville, Wis.
Strayer Seed Farms, Hudson, Iowa.
Hilmer B. Schauer, R. 3, Hartford, Wis.
S. B. Simons and Sons, R. 1, Elkhorn, Wis.
T. Searcy, Independence, Iowa.

Wisconsin Manchu No. 3

Tracy and Son Farms, Janesville, Wis.
Henry Petesch, R. 1, Belgium, Wis.
Hilmer B. Schauer, R. 3, Hartford, Wis.
Leo Kultgen, R. 1, Box 207, Belgium, Wis.
Fred Scherwitz and Son, R. 3, Fort Atkinson, Wis.
S. B. Simons and Sons, R. 1, Elkhorn, Wis.

Richland

Strayer Seed Farms, Hudson, Iowa.
W. N. Woods and Son, R. 1, Maumee, Ohio (registered).
Frank J. Anderson, R. 5, Frankfort, Ind. (certified).

Habaro

Hilmer B. Schauer, R. 3, Hartford, Wis.

EDIBLE VARIETIES

Bansei

W. N. Woods and Son, R. 1, Maumee, O.
Farm Management, Inc., Irwin, Ohio.
Strayer Seed Farms, Hudson, Iowa.
"Soybean" Johnson, 1151 Claytonia Terrace, Richmond Heights, Mo.

Rokusun Lima Size

Tastee Soy Foods, 254 East Girard Ave., Philadelphia, Pa.

Kwikook Yellows

Tastee Soy Foods, 254 East Girard Ave., Philadelphia, Pa.

Jogun

Strayer Seed Farms, Hudson, Iowa.

Aoda

"Soybean" Johnson, 1151 Claytonia Terrace, Richmond Heights, Mo.

Market Street

We invite the readers of *The Soybean Digest* to use "MARKET STREET" for their classified advertising. If you have processing machinery, laboratory equipment, soybean seed, or other items of interest to the industry, advertise them here.

Rate: 5c per word per issue. Minimum insertion $1.00.

Arcola Home Coming Plans Soybean Exhibit

A large soybean exhibit is being planned as a feature of the 1941 Arcola Home Coming, held every third year at Arcola, Ill. for the past 33 years. Its Broomcorn Palace attracted national publicity at its last event. Dates for the 1941 show are July 31, Aug. 1 and 2.

Under present plans the soybean exhibit will be in a tent 40 x 120 or 40 x 160 feet, and will cover every phase of the soybean industry. The event is sponsored by the Arcola Chamber of Commerce, of which Thomas F. Monahan, Jr., is general chairman.

IT PAYS to inoculate SOY BEANS EVERY YEAR with NOD-O-GEN

YES . . . it pays.

It pays to inoculate soy bean seed every year.

It pays even though inoculated soy beans grew on the same land the preceding year. To confirm these statements, check with your County Agent, your State Agricultural College, the United States Department of Agriculture and Page 2 of the March 1941 Issue of Soybean Digest.

Sometimes the bacteria die from one year to another. They may lose their vigor and produce very poor nodules. Frequently there are spots in your field which had no bacteria the preceding year.

You can't afford to take a chance . . . especially when inoculation with NOD-O-GEN costs so little and is so easily done.

Inoculation with NOD-O-GEN produces bigger yields, richer feed, and improves soil fertility. NOD-O-GEN stands high in all inspections by state and federal authorities. Every lot is pre-tested in laboratory and greenhouse prior to shipment to insure the presence of billions of vigorous bacteria of the proper kind.

This picture shows the results of inoculation. The plants were taken from the same soil area, those in the man's right hand having been inoculated, those in the left sown without inoculation.

LOOK FOR THE COLORED PACKAGE

For convenience and accuracy each variety of NOD-O-GEN . . . humus cultures . . . has an individual three colored label. For soy beans it is Yellow, Blue and Red.

THE TIME IS NOW

See your dealer about NOD-O-GEN now . . . The demand is tremendous. Last year some late orders could not be filled. Don't be disappointed this year.

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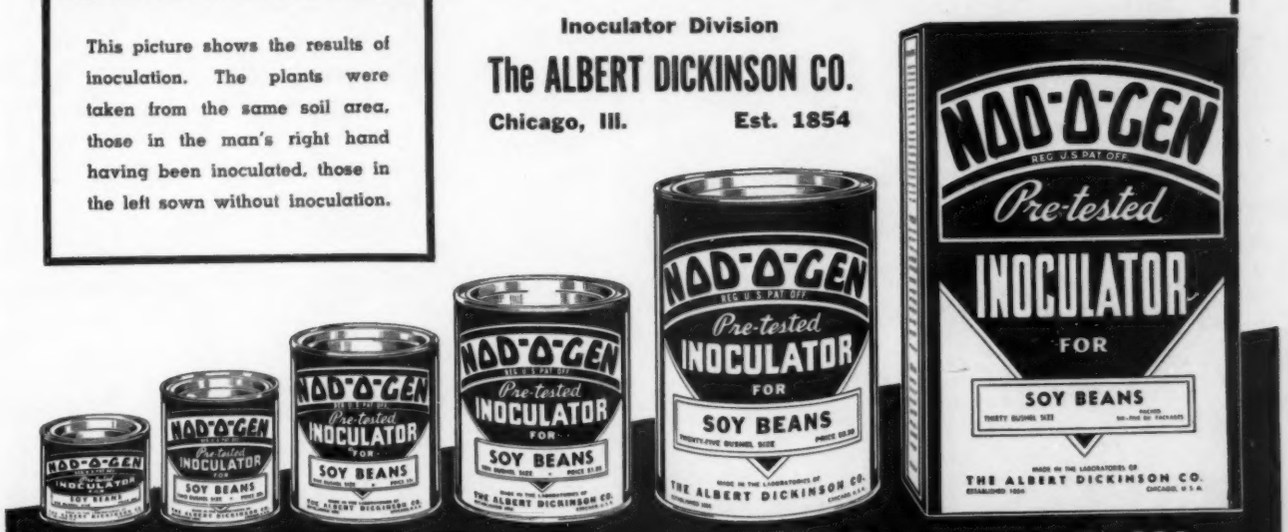

NOD-O-GEN The Pre-tested Inoculator

America's Largest Selling Complete Inoculator Line

What's New? . .

● What's new about the newest major cash crop of American agriculture, the soybean? What new magic are scientists finding in this humble little bean? Yes, literally, it will be learning what's new about the newest at the annual convention of the American Soybean Association September 12 and 13 at Des Moines, Iowa.

Growers especially will find the 1941 convention one of the most interesting yet staged, for their side of the soybean industry will be in the spotlight. A field day at Iowa State College in Ames will feature a tour of the breeding and yield test plots there. The whole program will be designed to bring about a better balance of emphasis within the industry which suddenly finds that research for more efficient production has been overshadowed in the drama of making plastics and paint.

But the annual convention is more than a science symposium on the soybean. It's a place, and the only place we know of, where soybean growers, processors, agronomists and research workers rub elbows on the same tables. There's a stimulant in personal contact with friends you haven't seen since last year's convention, enthusiasm grows anew as you swap problems and experiences. Check the dates on your calendar or memo book, and begin planning now to attend!

▼

Remember the American Soybean Association's

Annual Convention September 12-13

....AT....

Des Moines, Iowa